

REPLACED BY
AM 31 MAR 07Claims

1. A sharpening unit (50) for a blade (19), comprising a grinding wheel unit (80; 280) with at least two grinding wheels (51, 53; 251, 253) opposed to act on two sides defining a cutting bevel of said blade (19), characterized in that said grinding wheel unit is provided with at least a first degree of freedom to center the grinding wheels (51, 53; 251, 253) in respect of a lying surface of a portion of the cutting bevel of the blade (19) on which said grinding wheels act.

2. Sharpening unit as claimed in claim 1, characterized in that it comprises a system (65, 67, 69) to move the grinding wheel unit towards the blade along the direction (f63) of forward movement.

3. Sharpening unit as claimed in claim 1 or 2, characterized in that said grinding wheel unit is provided with a second degree of freedom, partly restricted, to center said grinding wheels in respect of said lying surface.

4. Sharpening unit as claimed in claim 3, characterized in that said grinding wheel unit can oscillate about an axis of oscillation (C-C) disposed in an intermediate position between the axes of rotation (A1-A1, A2-A2) of the grinding wheels (51, 53; 251, 253), the possibility to move about said axis of oscillation constituting said second degree of freedom.

5. Sharpening unit as claimed in claim 4, characterized in that said axis of oscillation (C-C) lies essentially on a lying plane of the portion of the cutting bevel of the blade on which said grinding wheels act, or on a plane that approximates a lying surface of said portion of cutting bevel of the blade.

6. Sharpening unit as claimed in at least claims 2 and 4, characterized in that said direction of forward movement (f63) of the grinding wheel unit is parallel to the axis of oscillation (C-C) of the grinding wheel unit (80; 280).

7. Sharpening unit as claimed in claim 4, 5 or 6, characterized in that said grinding wheels (51, 53; 251, 253) are disposed in an essentially symmetrical way in respect of said axis of oscillation (C-C).

8. Sharpening unit as claimed in one or more of the previous claims, characterized in that said grinding wheel unit (80; 280) is free to translate along a direction of translation (f81; f281) not parallel to the lying surface of the portion of cutting bevel on which said grinding wheels act, the movement along said direction of translation constituting said first degree of freedom.

9. Sharpening unit as claimed in claim 8, characterized in that said direction of

translation is essentially approximately orthogonal to said lying surface.

10. Sharpening unit as claimed in at least claims 4 and 8 or 4 and 9, characterized in that said axis of oscillation (C-C) is orthogonal to the direction of translation (f81; f281) of the grinding wheel unit.

5 11. Sharpening unit as claimed in at least claim 4, characterized in that the center of gravity of said grinding wheel unit (80; 280) lies on said axis of oscillation (C-C).

12. Sharpening unit as claimed in at least claim 8, characterized in that a counterweight moving along said direction of translation (f81; f281) is associated with said grinding wheel unit (80; 280), linking means (103) being provided to force the
10 counterweight to move in the opposite direction to said grinding wheel unit along said direction.

13. Sharpening unit as claimed in at least claim 4, characterized in that said grinding wheel unit is stressed in a predetermined angular position in respect of said axis of oscillation (C-C).

15 14. Sharpening unit as claimed in one or more of the previous claims, characterized in that it comprises means to bring said grinding wheels alternately into an operating position and into a non-operating position.

15. Sharpening unit as claimed in at least claims 3, 8 and 14, characterized in that said means comprise an actuator (357) that produces a movement of oscillation of the
20 grinding wheel unit (281) around said axis of oscillation (C-C) to move the grinding wheels (251, 253) against the blade in said operating position and hold them in contact with it, and in that said grinding wheel unit (281) is free to translate along said direction of translation (f281) to become centered in respect of the blade.

16. Sharpening unit as claimed in claim 15, characterized in that a control element
25 (351-365) operated by said actuator is associated with said grinding wheel unit, to act on the grinding wheel unit to move the grinding wheels against the blade and bring them into an operating position, said control element being irreversible, the stress exerted by the blade on the grinding wheels not producing the opposite movement to the movement to bring the grinding wheel against the blade.

30 17. Sharpening unit as claimed in claim 16, characterized in that said control element comprises a slider (351) rotating around its axis (D-D) controlled by said actuator, and a mechanism (361, 363, 365) that produces axial sliding of said slider in a support (351) when said slider is made to rotate around its axis by said actuator, axial sliding of the slider producing rotation of the grinding wheel unit in the direction to move the grinding

wheels (251, 253) against the blade (19).

18. Sharpening unit as claimed in at least claims 4 and 7, characterized in that said grinding wheel unit (80; 280) comprises a plate (87; 287) rotatingly supported around said axis of oscillation (C-C) by a slide (81; 281) sliding along a sliding guide (79) parallel to
5 said direction of translation (f81; f281).

19. Sharpening unit as claimed in at least claims 2 and 18, characterized in that said sliding guide is carried by a carriage (63) moving along said direction of forward movement (f63) of the grinding wheel unit (80; 280).

20. Sharpening unit as claimed in at least claim 4, characterized in that it comprises
10 an angular position sensor of the grinding wheel unit in respect of said angle of oscillation (C-C).

21. A cutting machine for cutting elongated products, comprising: at least a path for the products to be cut (L); at least a device (3, 5) to feed the products along said path; at least a blade (19) provided with a cutting movement to cut said products; at least a
15 sharpening unit (50) for said blade, which comprises a grinding wheel unit (80; 280) with at least two grinding wheels (51, 53; 251, 253) opposed to act on said blade (19), characterized in that said sharpening unit is made according to one or more of the previous claims.

22. Cutting machine as claimed in claim 21, characterized in that said grinding
20 wheel unit is oscillating around an axis of oscillation (C-C) essentially orthogonal to the direction of feed of the products to be cut along said path.

23. Cutting machine as claimed in claim 21 or 22, characterized in that said grinding wheel unit (80; 280) is free to translate along a direction of translation (f81) essentially parallel to the direction of feed (fL) of the products to be cut (L).

24. Cutting machine as claimed in at least one or more of claims 21 to 23, characterized in that said at least one blade (19) is a disk-shaped blade rotating around a respective axis (B-B), carried by a unit (17) rotating around its axis of rotation (A-A).

25. Cutting machine as claimed in claim 24, characterized in that said at least one disk-shaped rotating blade (19) is provided with an alternate movement essentially parallel
30 to the direction of feed of the products to be cut and in that a counterweight (101) is associated with said grinding wheel unit (80; 280) moving along said direction of translation, connection means (103) being provided to force the counterweight to move in the opposite direction to said grinding wheel unit along said direction.

26. Cutting machine as claimed in one or more of claims 21 to 25, characterized in

that two sharpening units are associated with said at least one blade.

27. Cutting machine as claimed in claim 26, characterized in that a first sharpening unit has idle grinding wheels and a second sharpening unit has motorized grinding wheels, the grinding wheels of the first unit and the grinding wheels of the second unit having
- 5 different inclinations in respect of said blade.